

## VIRTUAL COMPRESSOR OPERATIONAL PARAMETER MEASUREMENT AND SURGE DETECTION IN A FUEL CELL SYSTEM

### ABSTRACT OF THE DISCLOSURE

A fuel cell system that employs surge prevention by electronically mapping the compressor for discharge pressure versus mass airflow. In one embodiment, the fuel cell system employs a mass flow meter that measures the airflow to the compressor. A controller receives a signal from the mass flow meter indicative of the flow rate of the charge airflow to the compressor, and determines the outlet pressure and temperature of the compressor from the compressor speed and the measured airflow. This gives the compressor map location at which the compressor is operating. In another embodiment, the fuel cell system employs a pressure sensor that measures the output pressure of the compressor, and provides a pressure signal to the controller. The controller determines the mass airflow to the compressor to determine the compressor map location.